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INTRODUCTION TO THE PRIMITIVE TEXTILE WORK IN THE LABORATORY SCHOOL.

THE study of primitive forms of spinning and weaving is given in connection with the primitive history to illustrate further the life of people whose mode of living is simple and in direct contact with nature. This study also presents a craft which has an intimate place in the daily life of primitive people.

It has been suggested that in the study of textiles we might present more profitably present conditions of manufacture than to return to unused methods. The advantage of returning to these earlier methods, aside from giving a richer content to the period of history the child is concerned with, is that it presents an important industry of today reduced to its simplest elements.

The existing forms of the industry are too complex in the processes used, in the forms of the machines, and in organization, for children to comprehend. Whereas in primitive conditions we find the essential elements of the industry. Non-essentials are eliminated, and the basic principles stand out clear and definite.

The child realizes the conditions of the period by reconstructing for himself, with materials that would naturally be used by these people, a picture of their life. The materials are of such a nature that the child can reinvent processes and implements used. The dramatic instinct is appealed to in acting out the life and the occupations, the creative or artistic instinct in carrying a project to its end. The child's joy in doing what other people have done finds an outlet while he is gaining power in handling materials and in controlling processes. These impulses and experiences are realized in the finished product, which holds the child's interest throughout. The spinning and weaving are for the purpose of making blankets for the primitive family, and are done in a manner appropriate to the limitations of *its* life. The child also realizes in the progress of his work the artistic impulses of these primitive peoples, which are recalled in his

own quaint designs and color combinations. Such material is selected as will give pleasing results; that is to say the finished product should be beautiful, not alone from the child's point of view, that there may be nothing in it to offend or interfere with his judgment of what is appropriate, but most of all, it should contribute to his standard of judgment in things of an artistic nature.

In working out the different processes involved in making cloth, in using materials and implements suggested by necessity, and in observing the results reached by the people of the past, children realize the advance made in methods of work and can readily comprehend the meaning of industrial organization in its simple forms. This step precedes a more fruitful and concrete study of the later phases of industry; that is, of the household and domestic period which is richly illustrated in early colonial life. This again is followed by a study of the transition period, the era of inventions in England in the eighteenth century, which indicates economic conditions leading to factory organization. The study of each phase of industry is simplified by following its natural development by making it coincide with the history which provides the social setting. It has a further advantage in following each period of development of the child himself. He is himself advancing socially by easy stages, of such nature as enable him to comprehend cause and effect in the organization of the particular phases of industry he is pursuing.

When the child has passed through these different periods by means of actual direct work with materials, and observation of historical and economic facts, he can, in visiting the factory, grasp without mental confusion the essential and underlying principles of machines and processes, and the more subtle points in the organization of factory life. In addition to his intelligent insight into industrial life, and into its effect upon social life in history, the child gains experience of a scientific and æsthetic nature.

The subject-matter relating to primitive forms of spinning and weaving is obtained from a study of museum collections,

ethnological reports, and such information and materials as can be obtained of present primitive peoples.

REFERENCES: Otis T. Mason, *Origin of Inventions, Woman's Share in Primitive Culture;* Charles Vickersman, *Wool and Wool Spinning;* Richard Marsden, *Cotton Spinning and Weaving.*

In gathering materials for their own work and using only that which nature supplies, the children come to realize fully actual primitive conditions; their inventive spirit is stimulated, so that they are easily led to receive suggestions from the materials they use. They adapt and invent weaves suitable to flexible and rigid grasses, invent simple looms, and as the work proceeds realize the advantage of a continuous strand. They twist grasses, vegetable and animal fibers, and weave them into coarse mats, to be used either as furnishings to the primitive hut or as clothing for the primitive dolls. By winding on the twig, the spindle is developed. The aim is so to arrange the work that the *problem* comes to the child from his actual work, and, if possible, in such a way that he discovers the solution; *i. e.*, each step in the process is so dependent on the nature of the material that the children make the steps logically and of their own initiative.

The children gather together what they know from experience and from the work with fibers in Group III. They observe the difference in quality of the four typical kinds of cloth: wool, silk, cotton, and linen. They examine samples of fibers in the natural state—the silk on the cocoon, cotton in the bolls, wool, as it is sheared from the sheep, flax as it is gathered from the field. They select the fiber which they think was probably used by peoples in primitive conditions, *i. e.*, that requiring the least preparation, reaching their conclusions by means of the following process: They unwind the silk from the cocoon; find it fine, delicate, and difficult to handle. They remove the cotton from the bolls and separate the seeds from the fibers—a tedious task. Retted and unretted flax shows the long process of decay necessary to remove the fibers from the stalk. They examine the length and strength of each fiber to decide which one would probably be used by people in primitive conditions. The children do not

mention wool directly, but mention skins and furs. Otis T. Mason's chapter on the "Skin Dresser," as to how the primitive woman prepared the skins brought home by the hunter, was read to them. Illustrations of the scrapers were shown. Bird skins for the softer and more pliable undergarment were mentioned. The question of how these were pieced together came up, and the primitive method of sewing was described, as a process of piercing with a bone awl or fish-bone and tying together with tendons. The children bring from home leather or skins, any large fish-bones they can find, and tendons in order to repeat their work.

A fleece is examined and methods of shearing talked over. The next step in order should be a visit to a sheep ranch. If this is impossible, the children can substitute photographs and the relation of personal experiences. The relative quality of the different parts of the fleece is observed, and also the duties of the wool "sorter." Feltings, tarred locks, brands, and wool from lower parts of the legs are removed and spun into coarse yarn. The long, clean wool from neck, breast, and shoulders is made into yarn for the finer cloth. The back is usually full of burrs and more or less matted, requiring care before spinning. The children work out the whole process in detail for themselves by means of a series of experiments. They take wool from the fleece and get it into condition for spinning. The first thing that naturally suggests itself to them is to wash or "scour" it. Each child tries spinning both "scoured" and raw wool for the purpose of comparison. The oily fibers of the raw wool slip apart easily; the harsh, dry fibers of the scoured wool are matted together and difficult to manipulate. Thus they find from experience the reason for using unscoured wool in hand-spinning.

In order to spin wool in any quantity, burrs and dirt are first removed from the raw wool. One child suggested, in order to facilitate the process: "If you spread the fibers like a cobweb, the dirt will fall out." Three questions were raised in the course of the work: How would the fibers have to be arranged to make an even thread? How would the cross-fibers interfere with the evenness of the thread? How would dirt

interfere? At the end of the lesson the children formulated the purpose and method of carding. A clean fluffy mass of wool was drawn out in a long "sliver" one inch wide. Where thin places occurred they fitted in loose strands of wool. This gave them a clearer idea of the interlocking of the wool, due to the wavy character of the fiber. Carding implements were worked out. One wanted to bring a comb; they tried fastening pins in cardboard and making a comb of wood with several coarse teeth to take the place of the fingers. The fleece, as a whole, and even raw wool were new to nearly all the children. Many questions were asked, such as this: "What is the difference between hair and wool?" Wool and hair were examined under the microscope and sketches made for the children of the microscopical appearance of the two, showing the rough, scaly surface of the wool.

In dressing their dolls for the primitive houses, the children wanted to make a woolen blanket. Wool was selected for spinning the thread, and in half an hour they learned how to spin rather coarse thread, and in the second half-hour spun enough thread for the blanket. The children spun the thread in various ways, and at the end of the lesson they were shown how the mother in primitive times probably spun thread by rolling it on her knee.

When the sliver was too thick, the wool simply matted together; it would not interlock to make a hard twisted thread. The children tested the difference between matted wool and spun thread; also experimented to find the greatest number of fibers which would spin without matting. They gathered smooth twigs in an open lot near by and wound their spun thread to prevent tangling.

The child easily discovers that, when the end of the thread is left free and the twig is dropped, the twist is lost and the thread unwound. He reasons that by twirling the twig in the opposite direction the twig can be made to do the work he had previously done by rolling against his knee. He discovers also that when the twig is weighted with thread it draws out the carded wool and assists in the spinning.

Some of the children found it rather tedious to spin enough thread to finish the blanket. One child suggested that it was rather a slow way to spin. Attention was called to a spindle which was full of thread, and its spinning was compared with that of another spindle which was nearly empty. The full spindle could be twirled rapidly, as the carded wool was drawn from it. They thought of all kinds of materials which they might use to weight the spindle stick artificially, but the clay from the studio seemed easiest to use. They made whorls of clay and spun in this fashion.

The twig was weighted artificially with clay, stone, or wood, which suggested the whorl and its use in balancing and giving greater speed to the spindle. The advantage of having the whorl in the shape of a disk, to secure smoothness of motion was taken up as a problem. The children were pleased with the idea of the derivation of the toy top from the spindle, with the idea that when they were playing with tops they were doing what the child of long ago did when he imitated his mother's spinning.

A distaff and spindle were made in the shop, and each child practiced spinning a fine, smooth thread. They compared this with hand-spinning, and showed that it took less time and labor to produce the same amount of thread — many more fibers were made to interlock, and the thread was more uniformly twisted. Thus, by comparing in each case the handwork and that done by the crude implements, they were brought to realize the advance made in this first step in spinning.

The children changed the disks of their spindles in order to spin as the Italian women do, the spindle being twirled on the knee, and spun in the air. They found that it spun more easily and for a much longer time. They observed without suggestion that it was because there was nothing to stop it. They were asked whether there is anything to stop it if it is twirled in the air, and one child answered "no." They suggested that it might go on forever if there were nothing to stop it. A child said that it must be the drawing out of the carded wool that disturbed the spinning. They tried drawing out the

strand before twirling the spindle. The twirling was found to decrease in rapidity almost as readily as when the carded wool was drawn out at the same time. The children then believed that the air must disturb the spinning. Another child observed that of course it must be the air, as air has weight, and mentioned gravitation, and the air held to the earth by its weight.

The thread was made too fine for weaving. After having analyzed the structure of thread, they prepared to make "three-ply" yarn of the thread they had spun. They worked out the idea that the strands would have to be twisted together in the same manner as they had spun the yarn; that the various strands would have to be drawn out evenly, thus necessitating a frame on which the bobbins or spindle-sticks could revolve. The children held three bobbins in position, and then measured for the desired shape and size of the frame.

The yarn was ready to be scoured and dyed. The children saw quickly the advantage of having the yarn in loose hanks for dyeing. They wound the skeins about the backs of two chairs, one child delivering the yarn from the bobbin while another regulated it. They found it slow work and succeeded in making very small skeins. From this they were led to make something similar to the bobbin frame upon which to wind the skeins. A simple reel was made in the shop. The yarn from the spindles was wound into loose hanks for dyeing. As a preparation for weaving, cloth was examined, and its structure and texture compared with the mats and baskets they had previously woven.

The fact that weaving of materials that did not require spinning must have long preceded the invention of spinning was made clear from their own experience and in the examination of the work of present-day primitive peoples, in the following manner: The textile work of the primitive peoples of today was examined, and found to consist chiefly of grasses and various other raw materials. The beaten bark or "tapa" of the Hawaiians showed the interlacing of fibers. Discovery of a cast fleece matted after exposure to rain and sun may have suggested primitive cloth-making. The effect of water and heat on wool

was tried, and in some cases resulted in a fine piece of felt. The weaving of a rush mat from the chance placing of the reeds forming a sort of pattern on the clay floor of a primitive hut was suggested as a probable origin of pattern-weaving. The children gave the cocoon, the bird's nest, and the spider's web as instances of weaving. In the cloth the interlacing was found to be regularly adjusted into two sets of threads, respectively "warp" and "woof."

Each child explained his way of constructing a loom. The two beams to hold the warp in position, and the two cross-beams to keep them stretched. It was very simple, the children using only materials which they are likely to find in the woods, no prepared lumber or shop tools being used.

They made a loom of four twigs tied together with the thread they had spun. The warp and woof of the cloth was examined and reasons for having the warp stronger were experienced in the weaving.

A blanket was woven of the thread which they had spun. A few children finished their blankets in one hour. In the next period the blanket was cut from the loom, and the ends tied in a fringe. The blankets were then scoured and washed. The blanket being completed, we reviewed the work done during the quarter. The children sorted, teased, carded, and spun. The different processes making up the series were thus brought together, enabling the children to realize as a whole this stage of the industry.

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[*To be continued.*]